$$W = \sum_{i=1}^{3} \sum_{j=1}^{m} \frac{\mu_j}{\alpha_j} \left[\left(\lambda_i^{\alpha_j} - 1 \right) + \frac{1}{n} \left(J^{-n\alpha_j} - 1 \right) \right]$$

$$J = \lambda_1 \lambda_2 \lambda_3;$$

110

$$J\sigma_i = \sum_{j=1}^{m} \mu_j \left[\lambda_i^{\alpha_j} - J^{-n\alpha_j} \right], i = 1,2,3$$

120

$$\sigma_{oi} = \frac{1}{\lambda_i} \sum_{j=1}^{m} \mu_j \left[\lambda_i^{\alpha_j} - J^{-n\alpha_j} \right], i = 1,2,3$$

130

$$\lambda_2 = \lambda_3; \lambda_3 = \lambda_1^{-n/(2n+1)}$$

$$n = \frac{-\ln \lambda_3}{2 \ln \lambda_3 + \ln \lambda_1}$$

140

$$\sigma_0(\lambda_1) = \frac{1}{\lambda_1} \sum_{j=1}^{m} \mu_j \left[\lambda_1^{\alpha_j} - \lambda_1^{\frac{-n\alpha_j}{2n+1}} \right]$$

150

FIG. 1

$$f(\lambda_i) = \sum_{j=1}^{m} \mu_j \lambda_i^{\alpha j}$$ 210

$$\lambda_1 \sigma_0(\lambda_1) = f(\lambda_1) - f\left(\lambda_1^{-n/(2n+1)}\right)$$ 220

$$\upsilon = n/(2n+1)$$ 230

$$\lambda \sigma_0(\lambda) = f(\lambda) - f\left(\lambda^{-\upsilon}\right)$$ 240

$$\lambda^{-\upsilon} \sigma_0\left(\lambda^{-\upsilon}\right) = f\left(\lambda^{-\upsilon}\right) - f\left(\lambda^{\upsilon^2}\right)$$ 250

$$\lambda^{\upsilon^2} \sigma_0\left(\lambda^{\upsilon^2}\right) = f\left(\lambda^{\upsilon^2}\right) - f\left(\lambda^{-\upsilon^3}\right)$$

....

260

FIG. 2

$$f(\lambda) = \lambda\sigma_0(\lambda) + \lambda^{-\upsilon}\sigma_0(\lambda^{-\upsilon}) + \lambda^{\upsilon^2}\sigma_0(\lambda^{\upsilon^2}) + \lambda^{-\upsilon^3}\sigma_0(\lambda^{-\upsilon^3}) + \ldots$$

310

$$f(\lambda) = \lambda\,\sigma_0(\lambda) + \sum_{j=1}^{m} \lambda^{[-\upsilon]^j}\sigma_0\left(\lambda^{[-\upsilon]^j}\right)$$

320

$$\varepsilon_i = \lambda_i - 1$$

330

$$f(\lambda_i) = \lambda_i\sigma_0(\varepsilon_i) + \sum_{j=1}^{m} \lambda_i^{[-\upsilon]^j}\sigma_0\left(\lambda_i^{[-\upsilon]^j} - 1\right)$$

340

$$\sigma_{0i} = \frac{1}{\lambda_i}\left[f(\lambda_i) - f(J^{-n})\right]; i = 1,2,3$$

350

$$\sigma_i = \frac{1}{J}\left[f(\lambda_i) - f(J^{-n})\right]; i = 1,2,3$$

360

FIG. 3

430

$$\varepsilon_{0\min} = \min\left(\varepsilon_{0c}, \frac{1}{\sqrt{\varepsilon_{ot}+1}} - 1\right)$$

$$\varepsilon_{0\max} = \max\left(\varepsilon_{0t}, \frac{1}{\sqrt{\varepsilon_{oc}+1}} - 1\right)$$

$$\varepsilon_0 = \lambda - 1$$

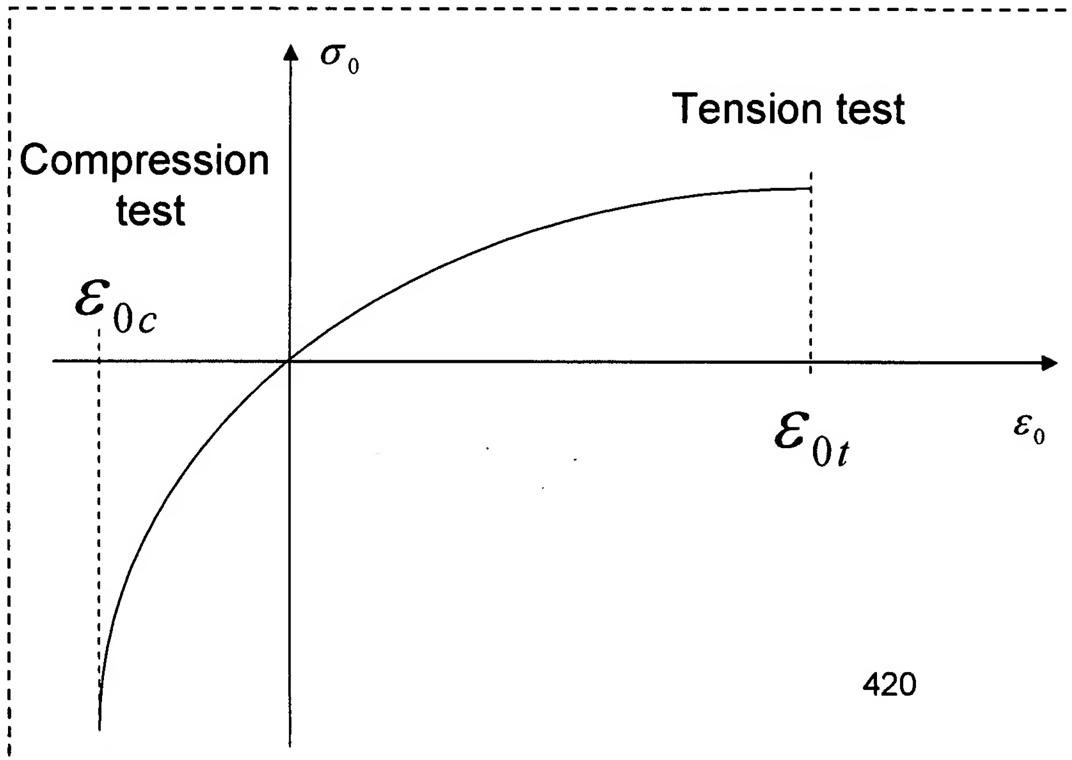

FIG. 4

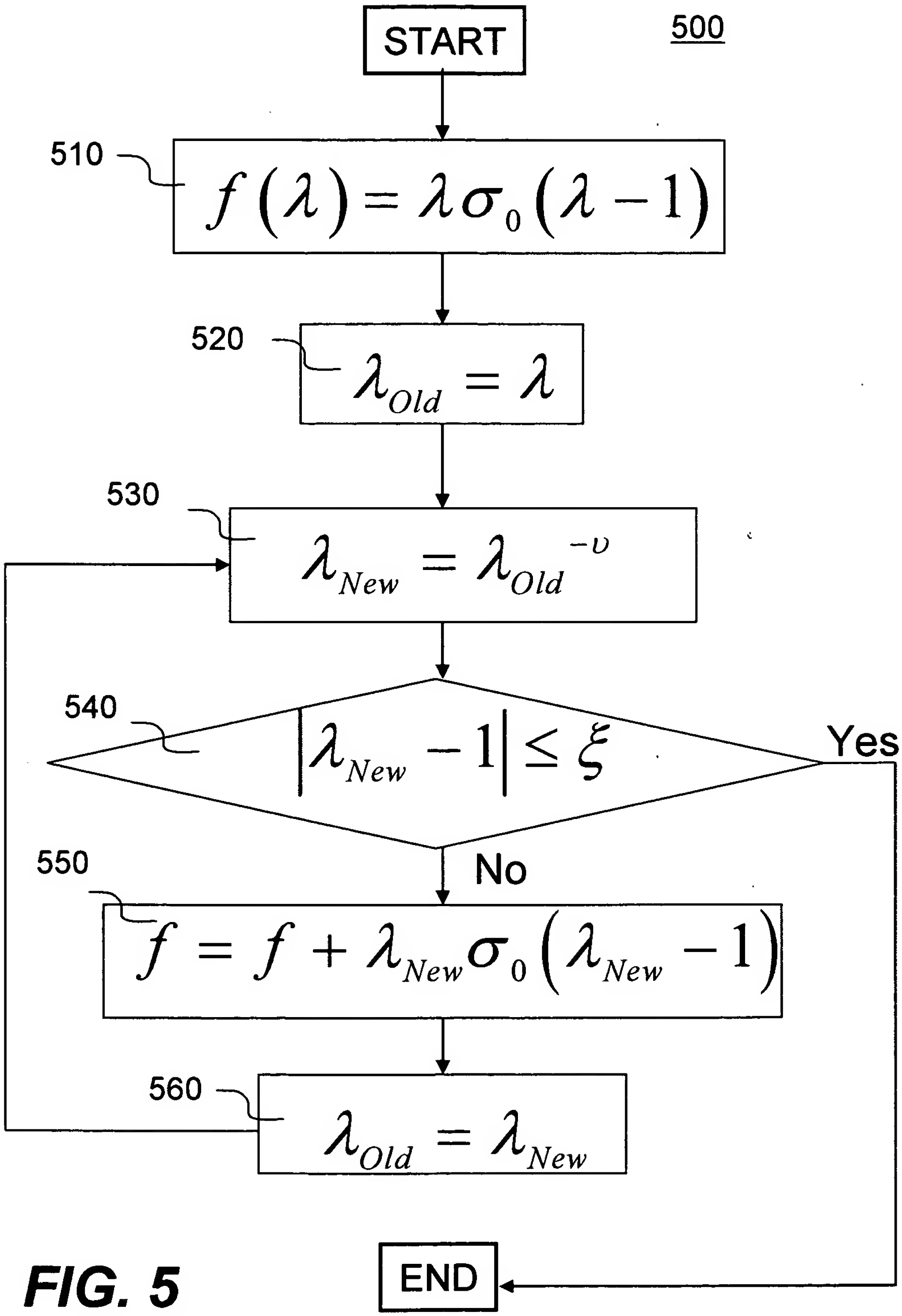
START
500
510
$f(\lambda) = \lambda\sigma_0(\lambda - 1)$
520
$\lambda_{Old} = \lambda$
530
$\lambda_{New} = \lambda_{Old}^{-\upsilon}$
540
$|\lambda_{New} - 1| \leq \xi$
Yes
No
550
$f = f + \lambda_{New}\sigma_0(\lambda_{New} - 1)$
560
$\lambda_{Old} = \lambda_{New}$
END

FIG. 5

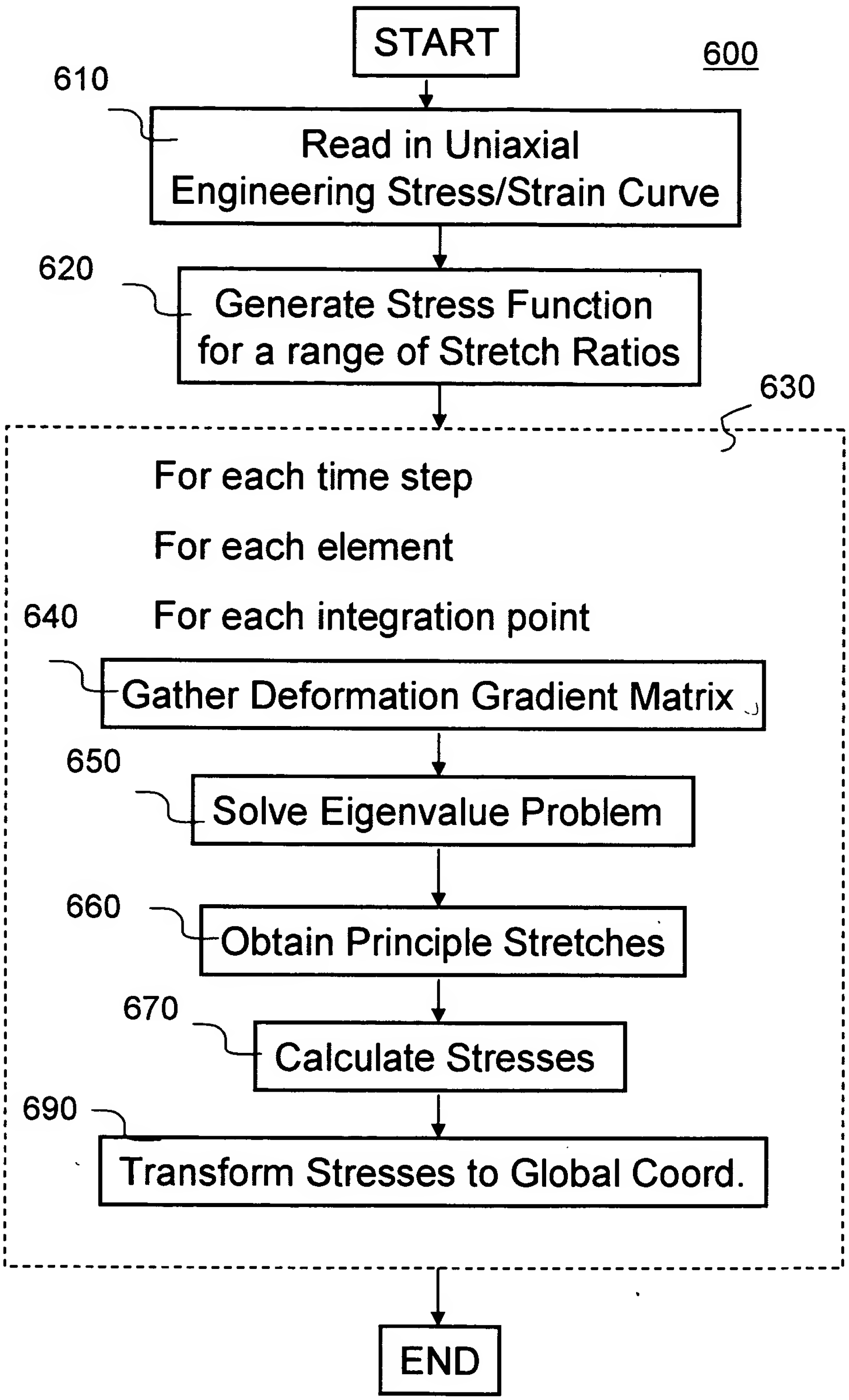
START
600
610
Read in Uniaxial Engineering Stress/Strain Curve
620
Generate Stress Function for a range of Stretch Ratios
630
For each time step
For each element
640
For each integration point
Gather Deformation Gradient Matrix
650
Solve Eigenvalue Problem
660
Obtain Principle Stretches
670
Calculate Stresses
690
Transform Stresses to Global Coord.
END

FIG. 6

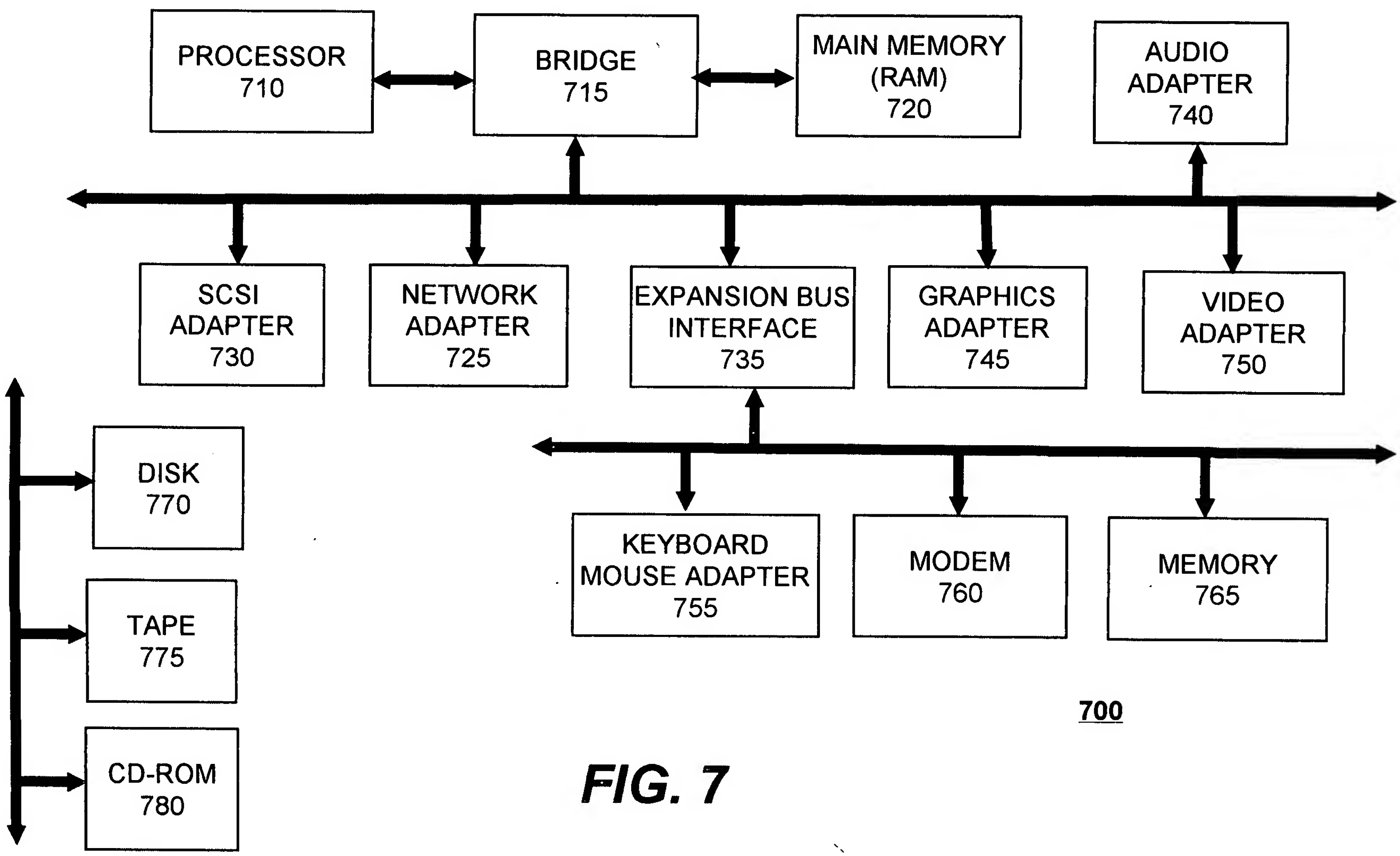
PROCESSOR 710
BRIDGE 715
MAIN MEMORY (RAM) 720
AUDIO ADAPTER 740
SCSI ADAPTER 730
NETWORK ADAPTER 725
EXPANSION BUS INTERFACE 735
GRAPHICS ADAPTER 745
VIDEO ADAPTER 750
DISK 770
TAPE 775
CD-ROM 780
KEYBOARD MOUSE ADAPTER 755
MODEM 760
MEMORY 765
700

FIG. 7